

# SEQUENCE LISTING

<110> Fraser, Clair  
 Galeotti, Cesira  
 Grandi, Guido  
 Hickey, Erin  
 Mesignani, Vega  
 Mora, Marirosa  
 Peterson, Jeremy  
 Pizza, Marigrazia  
 Rappuoli, Rino  
 Ratti, Giulio  
 Scarloto, Vincenzo  
 Scarselli, Maria  
 Tettelin, Herve  
 Venter, Craig

<120> Neisseria Meningitidis Antigens and Compositions

<130> CHIR0334

<140> 09/674,546

<141> 1999-04-30 (International Filing Date)

<160> 3264

<170> PatentIn Ver. 2.1

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<213> Neisseria gonorrhoeae

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 Ser Ser Cys Pro Ser Pro Lys Ile Gly Ala Val Pro Phe Ile Gly Ser  
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 cgggtacgca tactgtgccg gtttgggcga ttttgccgag atcgttacgc agcaaatacga 180  
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Pro Lys Arg Asp Thr Leu Asn Gly Ser Gly Thr His Thr Val Pro Val  
35 40 45

Trp Ala Ile Leu Pro Arg Ser Leu Arg Ser Lys Ser Thr Ile Ile Thr  
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Phe Ser Ala Arg Phe Phe Gly Ser Ala Cys Asn Ser Ala Ala Arg Arg  
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Ser Ser Cys Pro Ser Pro Lys Ile Gly Ala Val Pro Phe Ile Gly Ser  
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<213> Neisseria meningitidis

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<213> Neisseria meningitidis

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Pro Lys Arg Asp Thr Leu Asn Gly Ser Gly Thr His Thr Val Pro Val  
35 40 45

Trp Ala Ile Leu Pro Arg Ser Leu Arg Ser Lys Ser Thr Ile Ile Thr  
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Phe Ser Ala Arg Phe Phe Gly Ser Ala Cys Asn Ser Ala Ala Arg Arg

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Val Leu Met Val Pro Ser Glu Pro Ile Leu Arg Lys Ser Ser Gly Glu						
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Lys Thr Ala						
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 Arg Phe Phe Ile Arg Cys Arg Val Glu Ala Phe Ala Leu Arg Cys Gly  
 35 40 45  
 Phe Gly Phe Ala Arg Gln Arg Phe Val Gly Phe Ala Asp Val Asp Val  
 50 55 60

Ala Val Ala Val Gly Val Phe Asn Gln Val Val Leu Met Val Phe Leu  
65 70 75 80

Gly Val Val Glu Val Phe Gln Arg Phe Val Phe Asn Asn Glu Gly Gln  
85 90 95

Leu Val Phe Leu Leu Leu Ala Phe Glu Gly Gly Gly Asp Asp Gly Phe  
100 105 110

Phe Gly Gly Val Gly Val Val His Ala Ala Ala Val Leu Arg Ala Gly  
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Val Val Thr Leu Phe Val Glu Ala Gly Arg Ile Asn Asp Ala Glu Ile  
130 135 140

Ile Leu Gln Asp Val Val Gln Ala Glu Phe Val Gly Ile Val Gly His  
145 150 155 160

Phe Asp Gly Leu Gly Met Thr Arg Met Ala Val Gly His Phe Phe Val  
165 170 175

Arg Val Phe Arg Val Ala Val Gly Val Thr Gly Tyr Arg Val Asn His  
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Arg Phe Phe Ile Arg Cys Arg Val Glu Ala Phe Ala Leu Arg Gly Gly  
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50 55 60  
Ala Val Ala Val Gly Val Phe Asn Gln Val Val Leu Met Val Phe Leu  
65 70 75 80  
Gly Ile Val Glu Val Phe Gln Arg Leu Val Phe Asn Asn Glu Gly Gln  
85 90 95  
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100 105 110  
Phe Xaa Gly Val Gly Val Val His Ala Ala Ala Val Leu Arg Thr Gly  
115 120 125  
Val Val Ala Leu Phe Val Glu Ala Gly Arg Ile Asn Asp Ala Glu Glu  
130 135 140  
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145 150 155 160

Asp Gly Phe Gly Val Ala Arg Met Ala Val Gly His Val Phe Ile Ala  
165 170 175

Arg Ile Phe Arg Val Ala Val Gly Val Ala Gly Tyr Arg Val Asn His  
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35 40 45

Leu Gly Phe Ala Arg Gln Arg Phe Val Gly Phe Ala Asp Ile Asp Val  
50 55 60

Ala Val Ala Val Gly Val Phe Asn Gln Val Val Leu Met Val Phe Leu  
65 70 75 80

Gly Ile Val Glu Val Phe Gln Arg Leu Val Phe Asn Asn Glu Gly Gln  
85 90 95

Leu Val Phe Leu Leu Leu Ala Phe Glu Gly Gly Gly Asp Asp Gly Phe  
 100 105 110  
 Phe Gly Gly Val Gly Val Val His Ala Ala Ala Val Leu Arg Thr Gly  
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 Val Val Ala Leu Phe Val Glu Ala Gly Arg Ile Asn Asp Ala Glu Glu  
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 145 150 155 160  
 Asp Gly Phe Gly Val Ala Arg Met Ala Val Gly His Val Phe Ile Ala  
 165 170 175  
 Arg Ile Phe Arg Val Ala Val Gly Val Ala Gly Tyr Arg Val Asn His  
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 <213> *Neisseria gonorrhoeae*

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 <213> *Neisseria gonorrhoeae*

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 <213> *Neisseria meningitidis*

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Asp	Phe	Arg	Ala	Asp	Lys	Ala	Ala	Gly	Gly	Phe	Phe	Gly	Ile	Gln	Ala
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His	His	Ala	Asp	Gly	Ala	Ala	Pro	Gln	Thr	Ala	Ala	Asp	Ile	Arg	Val
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Ser	Pro	Ser	Cys	Ser	Gln	Trp	Thr	Ser	Thr	Leu	Pro	Ser	Ala	Ser	Ser
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Leu Thr Ser Val Leu Ala Ser Arg Cys Ser Phe Asn Ser Ser Pro Asn

210

215

220

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Ile Pro Pro Lys Pro Lys Ile Ser Thr Phe Thr Pro Lys Arg Cys Asn  
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<210> 17

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<212> DNA

<213> Neisseria meningitidis

<400> 17

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<212> PRT

<213> Neisseria meningitidis

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35 40 45

His Met Ala Phe Val Tyr Gln His His Ala Ala Ala Ala Leu Val Phe  
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Glu Arg Tyr Phe Ala Asp Asp Lys Phe Val Gly Leu Val Leu Arg Gly  
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Asn Leu Arg Val Phe Gln Thr Asp Lys Ala Asp Leu Arg Thr Gly Glu

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His Tyr Ala Asp Gly Ala Ala Ala Gln Thr Ala Ala Asp Ile Arg Val	100		105		110
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Ile Leu Val Cys Ile Val Ser Gly Ser Ala Thr Gly Thr Pro Arg Ala	145		150		155
Ser Phe Ser Ile Leu Met Phe Ser Lys Pro Ile Leu Ser Thr Phe Gly	165		170		175
Arg Arg Pro Thr Ala Ala Ser Ile Tyr Ser Ala Thr Asn Thr Pro Phe	180		185		190
Ser Pro Ser Cys Ser Gln Trp Thr Ser Thr Leu Pro Ser Ala Ser Ser	195		200		205
Leu Ala Ser Val Leu Ala Ser Lys Cys Ser Phe Asn Ser Ser Pro Asn	210		215		220
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 tatatgatgg cgtgtgtggc ggataaaaatt gtttcgctc cgtttgcggc catcggttcg 660  
 gtgggtgtgg tggcggaagt gccgaatatc caccgcctgt tgaaaaaaca tgatattgat 720  
 gtggatgtga tgacggcggg cgaatttaag cgcacgggta cttttatggg tgaaaatacg 780  
 gaaaagggca aacagaaatt ccggcaggaa ctggaggaaa cgcattcagtt gttcaagcag 840  
 tttgtcagtg aaaaccgccc cgggttggtat attgaaaaaa tagcgacggg cgagcattgg 900

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ttcggccggc aggcgttggc gttgaacttg attgacgaga tttcgaccag tgatgatttg 960
ttgttgaaag cgtttgaaaa caaacagggt atcgaagtga aatatacagga gaagcgaagc 1020
ctgatccagc gcattgggtt gcaggcggaa gcttcggttg aaaagttgtt tgccaaactt 1080
gtcaaccggc gagcgatgt gatgtag 1107

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<210> 20  
 <211> 368  
 <212> PRT  
 <213> *Neisseria gonorrhoeae*

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<400> 20
Met Gly Met Asp Asn Ile Asp Met Phe Met Pro Glu Gln Glu Glu Ile
  1              5              10              15

Gln Ser Met Trp Lys Glu Ile Leu Leu Asn Tyr Gly Ile Phe Leu Leu
      20              25              30

Glu Leu Leu Thr Val Phe Gly Ala Ile Ala Leu Ile Val Leu Ala Ile
      35              40              45

Val Gln Ser Lys Lys Gln Ser Glu Ser Gly Ser Val Val Leu Thr Asp
      50              55              60

Phe Ser Glu Asn Tyr Lys Lys Gln Arg Gln Ser Phe Glu Thr Phe Phe
      65              70              75              80

Leu Ser Glu Glu Glu Thr Lys His Gln Glu Lys Lys Glu Lys Lys Lys
      85              90              95

Glu Lys Ala Glu Ala Lys Ala Glu Lys Lys Arg Leu Lys Glu Gly Gly
      100             105             110

Glu Lys Ser Ala Glu Thr Gln Lys Ser Arg Leu Phe Val Leu Asp Phe
      115             120             125

Asp Gly Asp Leu Tyr Ala His Ala Val Glu Ser Leu Arg His Glu Ile
      130             135             140

Thr Ala Val Leu Leu Ile Ala Lys Pro Glu Asp Glu Val Leu Leu Arg
      145             150             155             160

Leu Glu Ser Pro Gly Gly Val Val His Gly Tyr Gly Leu Ala Ala Ser
      165             170             175

Gln Leu Arg Arg Leu Arg Glu Arg Asn Ile Pro Leu Thr Val Ala Val
      180             185             190

Asp Lys Val Ala Ala Ser Gly Gly Tyr Met Met Ala Cys Val Ala Asp
      195             200             205

Lys Ile Val Ser Ala Pro Phe Ala Val Ile Gly Ser Val Gly Val Val
      210             215             220

Ala Glu Val Pro Asn Ile His Arg Leu Leu Lys Lys His Asp Ile Asp
      225             230             235             240

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Val	Asp	Val	Met	Thr	Ala	Gly	Glu	Phe	Lys	Arg	Thr	Val	Thr	Phe	Met
				245					250					255	
Gly	Glu	Asn	Thr	Glu	Lys	Gly	Lys	Gln	Lys	Phe	Arg	Gln	Glu	Leu	Glu
			260					265					270		
Glu	Thr	His	Gln	Leu	Phe	Lys	Gln	Phe	Val	Ser	Glu	Asn	Arg	Pro	Gly
		275					280					285			
Leu	Asp	Ile	Glu	Lys	Ile	Ala	Thr	Gly	Glu	His	Trp	Phe	Gly	Arg	Gln
	290					295					300				
Ala	Leu	Ala	Leu	Asn	Leu	Ile	Asp	Glu	Ile	Ser	Thr	Ser	Asp	Asp	Leu
305					310					315					320
Leu	Leu	Lys	Ala	Phe	Glu	Asn	Lys	Gln	Val	Ile	Glu	Val	Lys	Tyr	Gln
			325						330					335	
Glu	Lys	Arg	Ser	Leu	Ile	Gln	Arg	Ile	Gly	Leu	Gln	Ala	Glu	Ala	Ser
		340						345					350		
Val	Glu	Lys	Leu	Phe	Ala	Lys	Leu	Val	Asn	Arg	Arg	Ala	Asp	Val	Met
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<210> 21  
 <211> 1100  
 <212> DNA  
 <213> Neisseria meningitidis

<220>  
 <221> misc\_feature  
 <222> (350)  
 <223> N is any nucleotide

<220>  
 <221> misc\_feature  
 <222> (374)..(581)  
 <223> N is any nucleotide

<400> 21  
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 ctgatttgtgt tggctatcgt acagagtaag aaacagtcgg awagcggcag tgtcgtactg 180  
 acggattttt cggaaaatta taaaaaacag cggcaatcgt ttgaagcatt ctttttaagc 240  
 ggggaagagg cacaacatca ggaaaaagag gaaaagaaaa aggaaaaggc ggaagccaaa 300  
 gcagagaaaa acgtttgaag gaggttgggg agaaatctgc cgaaacgcan aaatcacgcc 360  
 tttttgtggt ggannnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 420  
 nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 480  
 nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 540  
 nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn ngcgagcggc gggtatatga 600  
 tggcgtgtgt ggcggataaa attgcttccg ctccgtttgc gattgtcggg tcggtgggtg 660  
 tgggtggcga agtaccgaat atccaccgcc tgttgaaaaa acatgatatt gatgtggatg 720

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tgatgacggc gggcgaattt aagcgcacgg ttacttttat gggtgaaaat acggaaaagg 780
gcaaacagaa attccgacag gaactggagg aaacgcatca gttgttcaag cagtttgtca 840
gcgagaaccg ccctcaattg gatattgagg aagtggcaac gggcgagcat tggttcggtc 900
ggcaggcggtt ggcgttgaac ttgattgacg agatttcgac cagtgatgat ttgttggtga 960
aagcgtttga aaacaaacag gttatcgaag tgaaatatca ggagaagcaa agcctgatcc 1020
agcgcattgg tttgcaggcg gaagcttctg ttgaaaagtt gtttgccaaa cttgtcaacc 1080
ggcgggcgga tgtgatgtag                                     1100

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<210> 22
<211> 366
<212> PRT
<213> Neisseria meningitidis

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<220>
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<222> (54)
<223> Xaa is any amino acid

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<220>
<221> UNSURE
<222> (104)
<223> Xaa is any amino acid

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<220>
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<223> Xaa is any amino acid

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<220>
<221> UNSURE
<222> (125)..(194)
<223> Xaa is any amino acid

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<400> 22
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Met Trp Lys Glu Ile Leu Leu Asn Tyr Gly Ile Phe Leu Leu Glu Leu
      20             25             30

Leu Thr Val Phe Gly Ala Ile Ala Leu Ile Val Leu Ala Ile Val Gln
      35             40             45

Ser Lys Lys Gln Ser Xaa Ser Gly Ser Val Val Leu Thr Asp Phe Ser
      50             55             60

Glu Asn Tyr Lys Lys Gln Arg Gln Ser Phe Glu Ala Phe Phe Leu Ser
      65             70             75             80

Gly Glu Glu Ala Gln His Gln Glu Lys Glu Glu Lys Lys Lys Glu Lys
      85             90             95

Ala Glu Ala Lys Ala Glu Lys Xaa Arg Leu Lys Glu Gly Gly Glu Lys
      100            105            110

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Ser Ala Glu Thr Xaa Lys Ser Arg Leu Phe Val Leu Xaa Xaa Xaa Xaa  
115 120 125

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
130 135 140

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
145 150 155 160

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
165 170 175

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
180 185 190

Xaa Xaa Ala Ser Gly Gly Tyr Met Met Ala Cys Val Ala Asp Lys Ile  
195 200 205

Ala Ser Ala Pro Phe Ala Ile Val Gly Ser Val Gly Val Val Ala Glu  
210 215 220

Val Pro Asn Ile His Arg Leu Leu Lys Lys His Asp Ile Asp Val Asp  
225 230 235 240

Val Met Thr Ala Gly Glu Phe Lys Arg Thr Val Thr Phe Met Gly Glu  
245 250 255

Asn Thr Glu Lys Gly Lys Gln Lys Phe Arg Gln Glu Leu Glu Glu Thr  
260 265 270

His Gln Leu Phe Lys Gln Phe Val Ser Glu Asn Arg Pro Gln Leu Asp  
275 280 285

Ile Glu Glu Val Ala Thr Gly Glu His Trp Phe Gly Arg Gln Ala Leu  
290 295 300

Ala Leu Asn Leu Ile Asp Glu Ile Ser Thr Ser Asp Asp Leu Leu Leu  
305 310 315 320

Lys Ala Phe Glu Asn Lys Gln Val Ile Glu Val Lys Tyr Gln Glu Lys  
325 330 335

Gln Ser Leu Ile Gln Arg Ile Gly Leu Gln Ala Glu Ala Ser Val Glu  
340 345 350

Lys Leu Phe Ala Lys Leu Val Asn Arg Arg Ala Asp Val Met  
355 360 365

<210> 23

<211> 1101

<212> DNA

<213> Neisseria meningitidis

<400> 23

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attttactga attacggtat tttcctgctc gaactgctta ccgtgttcg cgcaattgcg 120



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ctgattgtgt tggctatcgt acagagtaag aaacagtcgg aaagcggcag tgtcgtactg 180
acggattttt cggaaaaatta taaaaaacag cggcaatcgt ttgaagcatt ctttttaagc 240
ggggaagagg caaaacatca ggaaaaagag gaaaagaaaa aggaaaaggc ggaagccaaa 300
gcagagaaaa agcgttttgaa ggagggtggg gagaaatctt ccgaaacgca aaaatcccgc 360
ctttttgtgt tggattttga cggcgatttg tatgcacacg ccgtagaatc cttgcgtcat 420
gagattacgg cggtgctttt gattgccaag cctgaagatg aggttctgct tagattggaa 480
agtcggggcg gcgtggttca cggttacggt ttggcggctt cgcagcttag gcgtttgcgc 540
gaacgcaata ttccgctgac cgtcgcgctc gataaggtgg cggcgagcgg tggttatatg 600
atggcgtgtg tggcggataa aattgtttcc gctccgtttg cgattgtcgg ttcggtgggt 660
gttgtagcgg aagtaccgaa tatccaccgc ctgttgaaaa aacatgatat tgatgtggat 720
gtgatgacgg cgggcgaatt taagcgcacg gttactttta tgggtgaaaa tacggaaaag 780
ggcaaacaga aattccgaca ggaactggag gaaacgcata agttgttcaa gcagtttgtc 840
agcgagaacc gccctcaatt ggatattgag gaagtggcaa cgggcgagca ttggttcggt 900
cggcaggcgt tggcgttgaa cttgattgac gagatttcga ccagtgatga tttgttggtg 960
aaagcgtttg aaaacaaaca ggttatcgaa gtgaaatatc aggagaagca aagcctgata 1020
cagcgatttg gtttgcaggc ggaagcttct gttgaaaagt tgtttgcaa acttgtcaac 1080
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<210> 24

<211> 366

<212> PRT

<213> *Neisseria meningitidis*

<400> 24

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Met Asp Asn Ile Asp Met Phe Met Pro Glu Gln Glu Glu Ile Gln Ser
  1               5               10               15

Met Trp Lys Glu Ile Leu Leu Asn Tyr Gly Ile Phe Leu Leu Glu Leu
      20               25               30

Leu Thr Val Phe Gly Ala Ile Ala Leu Ile Val Leu Ala Ile Val Gln
      35               40               45

Ser Lys Lys Gln Ser Glu Ser Gly Ser Val Val Leu Thr Asp Phe Ser
      50               55               60

Glu Asn Tyr Lys Lys Gln Arg Gln Ser Phe Glu Ala Phe Phe Leu Ser
      65               70               75               80

Gly Glu Glu Ala Lys His Gln Glu Lys Glu Glu Lys Lys Lys Glu Lys
      85               90               95

Ala Glu Ala Lys Ala Glu Lys Lys Arg Leu Lys Glu Gly Gly Glu Lys
      100              105              110

Ser Ser Glu Thr Gln Lys Ser Arg Leu Phe Val Leu Asp Phe Asp Gly
      115              120              125

Asp Leu Tyr Ala His Ala Val Glu Ser Leu Arg His Glu Ile Thr Ala
      130              135              140

Val Leu Leu Ile Ala Lys Pro Glu Asp Glu Val Leu Leu Arg Leu Glu
      145              150              155              160

Ser Pro Gly Gly Val Val His Gly Tyr Gly Leu Ala Ala Ser Gln Leu
      165              170              175

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Arg Arg Leu Arg Glu Arg Asn Ile Pro Leu Thr Val Ala Val Asp Lys  
 180 185 190  
 Val Ala Ala Ser Gly Gly Tyr Met Met Ala Cys Val Ala Asp Lys Ile  
 195 200 205  
 Val Ser Ala Pro Phe Ala Ile Val Gly Ser Val Gly Val Val Ala Glu  
 210 215 220  
 Val Pro Asn Ile His Arg Leu Leu Lys Lys His Asp Ile Asp Val Asp  
 225 230 235 240  
 Val Met Thr Ala Gly Glu Phe Lys Arg Thr Val Thr Phe Met Gly Glu  
 245 250 255  
 Asn Thr Glu Lys Gly Lys Gln Lys Phe Arg Gln Glu Leu Glu Glu Thr  
 260 265 270  
 His Gln Leu Phe Lys Gln Phe Val Ser Glu Asn Arg Pro Gln Leu Asp  
 275 280 285  
 Ile Glu Glu Val Ala Thr Gly Glu His Trp Phe Gly Arg Gln Ala Leu  
 290 295 300  
 Ala Leu Asn Leu Ile Asp Glu Ile Ser Thr Ser Asp Asp Leu Leu Leu  
 305 310 315 320  
 Lys Ala Phe Glu Asn Lys Gln Val Ile Glu Val Lys Tyr Gln Glu Lys  
 325 330 335  
 Gln Ser Leu Ile Gln Arg Ile Gly Leu Gln Ala Glu Ala Ser Val Glu  
 340 345 350  
 Lys Leu Phe Ala Lys Leu Val Asn Arg Arg Ala Asp Val Met  
 355 360 365

<210> 25  
 <211> 462  
 <212> DNA  
 <213> Neisseria gonorrhoeae

<400> 25  
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 ttatggcttt tgccacgttt tgccgccatc agcgaaaacc tgtatttccg cctgaacaac 120  
 agcttggaac gcgacaacca ctttatccga aaaggcgacg agcggcagct gtaccgccat 180  
 tacggactgg tttcgcgcct gcgtgtgctg atttccaacc gcgaagcctt cggctatctc 240  
 tgcgtcggcg cggcgatggg tattttgttc ggctttgctt ttgtgatgat gacgtcaaa 300  
 ggctacggca gcgcggggca tatttattcg gtcggcactt atctgtggat gtttgccatg 360  
 agtttgacg atgtgccgcg attggtcgaa caatattcca atttgaaaga catcggacaa 420  
 cggatagagt ggtcggaaacg gaacatcaaa gccggaactt ga 462

<210> 26  
 <211> 153  
 <212> PRT

<213> Neisseria gonorrhoeae

<400> 26

Met Leu Leu Val Leu Glu Phe Trp Phe Gly Val Ser Ala Val Gly Ile  
1 5 10 15  
Leu Ala Leu Phe Leu Trp Leu Leu Pro Arg Phe Ala Ala Ile Ser Glu  
20 25 30  
Asn Leu Tyr Phe Arg Leu Asn Asn Ser Leu Glu Arg Asp Asn His Phe  
35 40 45  
Ile Arg Lys Gly Asp Glu Arg Gln Leu Tyr Arg His Tyr Gly Leu Val  
50 55 60  
Ser Arg Leu Arg Val Leu Ile Ser Asn Arg Glu Ala Phe Gly Tyr Leu  
65 70 75 80  
Cys Val Gly Ala Ala Met Gly Ile Leu Phe Gly Phe Ala Phe Val Met  
85 90 95  
Met Thr Leu Lys Gly Tyr Gly Ser Ala Gly His Ile Tyr Ser Val Gly  
100 105 110  
Thr Tyr Leu Trp Met Phe Ala Met Ser Leu Asp Asp Val Pro Arg Leu  
115 120 125  
Val Glu Gln Tyr Ser Asn Leu Lys Asp Ile Gly Gln Arg Ile Glu Trp  
130 135 140  
Ser Glu Arg Asn Ile Lys Ala Gly Thr  
145 150

<210> 27

<211> 462

<212> DNA

<213> Neisseria meningitidis

<400> 27

atgctgctgg tgctggaatt ttgggtcggc gtgtcggcgg tgggcatact tgcgttggtt 60  
ttatggcttt tgccacgttt tgccgccatc agcgaaaacc tgtatttccg cctgaacaac 120  
agcttggaac gcgacaacca ctttatccga aaaggcgacc ggcggcagct gtaccgccat 180  
tacggactgc ttgcgcgcct gcgtgtgctg atttccaacc gcgaagcctt cggctatctc 240  
tgctcggca cgcgatggg tattttgttc ggctttgctt ttgtgatgat gacgctcaaa 300  
ggctacagca gcgcggggca tgtctattcg gtcggcactt atctgtggat gtttgccatg 360  
agtttgacg acgtgccgcg attggtcgaa caatattcca atttgaaaga catcggacaa 420  
cggatagagt ggtcggaaacg gaacatcaaa gccggaactt ga 462

<210> 28

<211> 153

<212> PRT

<213> Neisseria meningitidis

<400> 28

Met Leu Leu Val Leu Glu Phe Trp Val Gly Val Ser Ala Val Gly Ile

1	5	10	15
Leu Ala Leu Phe Leu Trp Leu Leu Pro Arg Phe Ala Ala Ile Ser Glu			
20	25	30	
Asn Leu Tyr Phe Arg Leu Asn Asn Ser Leu Glu Arg Asp Asn His Phe			
35	40	45	
Ile Arg Lys Gly Asp Arg Arg Gln Leu Tyr Arg His Tyr Gly Leu Leu			
50	55	60	
Ala Arg Leu Arg Val Leu Ile Ser Asn Arg Glu Ala Phe Gly Tyr Leu			
65	70	75	80
Cys Val Gly Thr Ala Met Gly Ile Leu Phe Gly Phe Ala Phe Val Met			
85	90	95	
Met Thr Leu Lys Gly Tyr Ser Ser Ala Gly His Val Tyr Ser Val Gly			
100	105	110	
Thr Tyr Leu Trp Met Phe Ala Met Ser Leu Asp Asp Val Pro Arg Leu			
115	120	125	
Val Glu Gln Tyr Ser Asn Leu Lys Asp Ile Gly Gln Arg Ile Glu Trp			
130	135	140	

Ser Glu Arg Asn Ile Lys Ala Gly Thr  
145 150

<210> 29  
<211> 462  
<212> DNA  
<213> Neisseria meningitidis

<400> 29  
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agcttggaac gcgacaacca ctttatccga aaaggcgacg agcggcagct ggaccgccat 180  
tacggactgc ttgcgcgcct gcgtgtgctg atttccaacc gcgaagcctt cggctatctc 240  
tgcgtcggca cggcgatggg tattttgttc ggctttgctt ttgtgatgat gacgctcaaa 300  
ggctacagca gcgcggggca tgtctattcg gtcggcactt atctgtggat gtttgccata 360  
agtttgacg acgtgccgcg attggtcgaa caatattcca atttgaaaga catcggacaa 420  
cggatagagt ggtcgaaaacg gaacatcaaa gccggaactt ga 462

<210> 30  
<211> 153  
<212> PRT  
<213> Neisseria meningitidis

<400> 30  
Met Leu Leu Val Leu Glu Phe Trp Val Gly Val Ser Ala Val Gly Ile  
1 5 10 15  
Leu Ala Leu Phe Leu Trp Leu Leu Pro Arg Phe Ala Ala Ile Ser Glu

20	25	30
Asn Leu Tyr Phe Arg Leu Lys Asn Ser Leu Glu Arg Asp Asn His Phe		
35	40	45
Ile Arg Lys Gly Asp Glu Arg Gln Leu Asp Arg His Tyr Gly Leu Leu		
50	55	60
Ala Arg Leu Arg Val Leu Ile Ser Asn Arg Glu Ala Phe Gly Tyr Leu		
65	70	75
Cys Val Gly Thr Ala Met Gly Ile Leu Phe Gly Phe Ala Phe Val Met		
85	90	95
Met Thr Leu Lys Gly Tyr Ser Ser Ala Gly His Val Tyr Ser Val Gly		
100	105	110
Thr Tyr Leu Trp Met Phe Ala Ile Ser Leu Asp Asp Val Pro Arg Leu		
115	120	125
Val Glu Gln Tyr Ser Asn Leu Lys Asp Ile Gly Gln Arg Ile Glu Trp		
130	135	140
Ser Lys Arg Asn Ile Lys Ala Gly Thr		
145	150	

<210> 31  
 <211> 867  
 <212> DNA  
 <213> Neisseria gonorrhoeae

<400> 31  
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 tcccgggtcg gactggaaaa ccttttgatg ctgggggtatc cggtgtttgg cggctgggcg 120  
 attaatgccg tgattgctggg gaggggtgtg caggcggtgc tgtacgcttt gggtgtattt 180  
 ttgatgtggc tggctcgggtgc ggcacggcgg attgccgata cgcgcacgtt tacgcggatt 240  
 tataccgaaa tcgccgtgcc ggttgtgttg gaacaacggc agcggcaagt cccgcattca 300  
 gcggttaactg cacgggttgc cctgtcgcgt gaatttgtca gcttttttga agaacacctg 360  
 ccgattgccg cgacatccgt cgtatccata ttcggcgcgt gcatcatgct gctgggtgctg 420  
 gaattttggg tcggcgtgtc ggcgggtggc atacttgcgt tgtttttatg gcttttgcca 480  
 cgttttgccc ccatcagcga aaacctgtat ttccgcctga acaacagctt ggaacgcgac 540  
 aaccacttta tccgaaaagg cgacgagcgg cagctgtacc gccattacgg actggtttcg 600  
 cgctgtcgtg tgctgatttc caaccgcgaa gccttcggct atctctgcgt cggcgcggcg 660  
 atgggtattt tgctcggtt tgcttttgtg atgatgacgc tcaaaggcta cggcagcgcg 720  
 gggcatattt attcggtcgg cacttatctg tggatgtttg ccatgagttt ggacgatgtg 780  
 ccgcgatttg tcgaacaata ttccaatttg aaagacatcg gacaacggat agagtggctg 840  
 gaacggaaca tcaaagccgg aacttga 867

<210> 32  
 <211> 288  
 <212> PRT  
 <213> Neisseria gonorrhoeae

<400> 32  
 Met Trp Lys Met Leu Lys His Ile Ala Lys Thr His Arg Lys Arg Leu

1	5	10	15
Ile Gly Thr Phe Ser Pro Val Gly Leu Glu Asn Leu Leu Met Leu Gly	20	25	30
Tyr Pro Val Phe Gly Gly Trp Ala Ile Asn Ala Val Ile Ala Gly Arg	35	40	45
Val Trp Gln Ala Leu Leu Tyr Ala Leu Val Val Phe Leu Met Trp Leu	50	55	60
Val Gly Ala Ala Arg Arg Ile Ala Asp Thr Arg Thr Phe Thr Arg Ile	65	70	75
Tyr Thr Glu Ile Ala Val Pro Val Val Leu Glu Gln Arg Gln Arg Gln	85	90	95
Val Pro His Ser Ala Val Thr Ala Arg Val Ala Leu Ser Arg Glu Phe	100	105	110
Val Ser Phe Phe Glu Glu His Leu Pro Ile Ala Ala Thr Ser Val Val	115	120	125
Ser Ile Phe Gly Ala Cys Ile Met Leu Leu Val Leu Glu Phe Trp Val	130	135	140
Gly Val Ser Ala Val Gly Ile Leu Ala Leu Phe Leu Trp Leu Leu Pro	145	150	155
Arg Phe Ala Ala Ile Ser Glu Asn Leu Tyr Phe Arg Leu Asn Asn Ser	165	170	175
Leu Glu Arg Asp Asn His Phe Ile Arg Lys Gly Asp Glu Arg Gln Leu	180	185	190
Tyr Arg His Tyr Gly Leu Val Ser Arg Leu Arg Val Leu Ile Ser Asn	195	200	205
Arg Glu Ala Phe Gly Tyr Leu Cys Val Gly Ala Ala Met Gly Ile Leu	210	215	220
Phe Gly Phe Ala Phe Val Met Met Thr Leu Lys Gly Tyr Gly Ser Ala	225	230	235
Gly His Ile Tyr Ser Val Gly Thr Tyr Leu Trp Met Phe Ala Met Ser	245	250	255
Leu Asp Asp Val Pro Arg Leu Val Glu Gln Tyr Ser Asn Leu Lys Asp	260	265	270
Ile Gly Gln Arg Ile Glu Trp Ser Glu Arg Asn Ile Lys Ala Gly Thr	275	280	285

<210> 33  
 <211> 867  
 <212> DNA  
 <213> Neisseria meningitidis

<400> 33  
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 atcaatgccg tgattgcggg ggaggtgtgg caggcggtgc tgtacgcttt ggttgtgctt 180  
 ttgatgtggc tggtcggtgc ggtgcggcgg attgccgata cgcgcacggt tacgcggatt 240  
 tataccgaaa tcgccgtgcc ggtcgtgttg gaacagcggc agcgacaagt cccgcattcg 300  
 gcggttaactg cgcgggttgc cctgtcgcgt gagtttgtca gcttttttga agaacacctg 360  
 ccgattgccg cgacatccgt cgtatccata ttcggcgcgt gcatcatgct gctggtgctg 420  
 gaattttggg tcggcgtgtc ggccgtgggc atacttgctg tgtttttatg gcttttgcca 480  
 cgttttgccg ccatcagcga aaacctgtat ttccgcctga acaacagctt ggaacgcgac 540  
 aaccacttta tccgaaaagg cgaccggcgg cagctgtacc gccattacgg actgcttgcg 600  
 cgctgctgtg tgctgatttc caaccgcgaa gccttcggct atctctgcgt cggcacggcg 660  
 atgggtattt tgctcggtt tgcttttgtg atgatgacgc tcaaaggcta cagcagcgcg 720  
 gggcatgtct attcggtcgg cacttatctg tggatgtttg ccatgagttt ggacgacgtg 780  
 ccgcgattgg tcgaacaata ttccaatttg aaagacatcg gacaacggat agagtggctg 840  
 gaacggaaca tcaaagccgg aacttga 867

<210> 34  
 <211> 288  
 <212> PRT  
 <213> Neisseria meningitidis

<400> 34  
 Met Trp Lys Met Leu Lys His Ile Ala Gln Thr His Arg Lys Arg Leu  
 1 5 10 15  
 Ile Gly Thr Phe Ser Leu Val Gly Leu Glu Asn Leu Leu Met Leu Val  
 20 25 30  
 Tyr Pro Val Phe Gly Gly Arg Ala Ile Asn Ala Val Ile Ala Gly Glu  
 35 40 45  
 Val Trp Gln Ala Leu Leu Tyr Ala Leu Val Val Leu Leu Met Trp Leu  
 50 55 60  
 Val Gly Ala Val Arg Arg Ile Ala Asp Thr Arg Thr Phe Thr Arg Ile  
 65 70 75 80  
 Tyr Thr Glu Ile Ala Val Pro Val Val Leu Glu Gln Arg Gln Arg Gln  
 85 90 95  
 Val Pro His Ser Ala Val Thr Ala Arg Val Ala Leu Ser Arg Glu Phe  
 100 105 110  
 Val Ser Phe Phe Glu Glu His Leu Pro Ile Ala Ala Thr Ser Val Val  
 115 120 125  
 Ser Ile Phe Gly Ala Cys Ile Met Leu Leu Val Leu Glu Phe Trp Val  
 130 135 140

Gly Val Ser Ala Val Gly Ile Leu Ala Leu Phe Leu Trp Leu Leu Pro  
 145 150 155 160  
 Arg Phe Ala Ala Ile Ser Glu Asn Leu Tyr Phe Arg Leu Asn Asn Ser  
 165 170 175  
 Leu Glu Arg Asp Asn His Phe Ile Arg Lys Gly Asp Arg Arg Gln Leu  
 180 185 190  
 Tyr Arg His Tyr Gly Leu Leu Ala Arg Leu Arg Val Leu Ile Ser Asn  
 195 200 205  
 Arg Glu Ala Phe Gly Tyr Leu Cys Val Gly Thr Ala Met Gly Ile Leu  
 210 215 220  
 Phe Gly Phe Ala Phe Val Met Met Thr Leu Lys Gly Tyr Ser Ser Ala  
 225 230 235 240  
 Gly His Val Tyr Ser Val Gly Thr Tyr Leu Trp Met Phe Ala Met Ser  
 245 250 255  
 Leu Asp Asp Val Pro Arg Leu Val Glu Gln Tyr Ser Asn Leu Lys Asp  
 260 265 270  
 Ile Gly Gln Arg Ile Glu Trp Ser Glu Arg Asn Ile Lys Ala Gly Thr  
 275 280 285

<210> 35  
 <211> 843  
 <212> DNA  
 <213> Neisseria meningitidis

<400> 35  
 agccaaaacc accgcaagcg attgattggc acatttttttc tggtcggact ggaaaacctt 60  
 ttgatgctgg tgtatccggt gtttggcggc tgggcgatta atgccgtgat tgcggggcag 120  
 gcgtggcagg cggttgcgtgta cgcttttggt gtgcttttga tgtggctggt cggcgccg 180  
 cggcggtatt ccgatacgcg cacgtttacg cggatttata ccgaaatcgc cgtgccggtt 240  
 gtgttggaac agcggcagcg gcaagtcccg cattcgccg taactgcgcg ggttgccctg 300  
 tcgcgtgagt ttgtcagctt ttttgaagaa cacctgccga ttgccgcgac atccgctcgt 360  
 tccatattcg gcgcgtgcat catgctgctg gtgctggaat tttgggtcgg cgtgtcggcg 420  
 gtgggcatac ttgcgttggt tttatggctt ttgccacggt ttgccgccat cagcgaaaaac 480  
 ctgtattttc gcctgaagaa cagcttggaa cgcgacaacc actttatccg aaaaggcgac 540  
 gagcggcagc tggaccgcca ttacggactg cttgcgcgcc tgcgtgtgct gatttccaac 600  
 cgcgaagcct tcggctatct ctgcgtcggc acggcgatgg gtattttggt cggctttgct 660  
 tttgtgatga tgacgctcaa aggctacagc agcgcggggc atgtctattc ggtcggcact 720  
 tatctgtgga tgtttgccat aagtttggac gacgtgccgc gattggtcga acaatattcc 780  
 aatttgaaag acatcggaca acggatagag tggtcgaaac ggaacatcaa agccggaact 840  
 tga 843

<210> 36  
 <211> 280  
 <212> PRT





<210> 37  
 <211> 342  
 <212> DNA  
 <213> *Neisseria gonorrhoeae*

<400> 37  
 atgaacacaa cccgactgcc gaccgccttc atcttgtgct gcctctgcgc cgccgcttct 60  
 gccgccgaca acagcatcat gacaaaaggg caaaaagtgt acgaatccaa ctgcatcgcc 120  
 tgccacggca agaaagggga agggcgcggc actgcgtttc ctccgctttt ccggtcggac 180  
 tgtattatga acaaaccgca cgtcctgctg cacagcatgg tcaaaggcat cgacgggaca 240  
 ttcaaagtgg agcggcaaaa cctacgacgg atttatgccc gcaaccgcca tcagcgatgc 300  
 ggacattgcc gccgtcgcca cttatatcat gaacgccttt ga 342

<210> 38  
 <211> 113  
 <212> PRT  
 <213> *Neisseria gonorrhoeae*

<400> 38  
 Met Asn Thr Thr Arg Leu Pro Thr Ala Phe Ile Leu Cys Cys Leu Cys  
 1 5 10 15  
 Ala Ala Ala Ser Ala Ala Asp Asn Ser Ile Met Thr Lys Gly Gln Lys  
 20 25 30  
 Val Tyr Glu Ser Asn Cys Ile Ala Cys His Gly Lys Lys Gly Glu Gly  
 35 40 45  
 Arg Gly Thr Ala Phe Pro Pro Leu Phe Arg Ser Asp Cys Ile Met Asn  
 50 55 60  
 Lys Pro His Val Leu Leu His Ser Met Val Lys Gly Ile Asp Gly Thr  
 65 70 75 80  
 Phe Lys Val Glu Arg Gln Asn Leu Arg Arg Ile Tyr Ala Arg Asn Arg  
 85 90 95  
 His Gln Arg Cys Gly His Cys Arg Arg Arg His Leu Tyr His Glu Arg  
 100 105 110  
 Leu

<210> 39  
 <211> 341  
 <212> DNA  
 <213> *Neisseria meningitidis*

<400> 39  
 atgaacacaa cccgactgcc gaccgccttc gtcttgggct gcttctgcgc cgccgcttct 60  
 gccgccgaca acagcatcat gacaaaaggg caaaaagtgt acgaatccaa ctgcatcgcc 120  
 tgccacggca aaaagggcga agggcgcgga accatgtttc cgccgctcta ccgctccgac 180  
 ttcacatga aaaaaccgca ggtgctgctg cacagcatgg tcaaaggcat caacggtaca 240

atcaaagtca acggcaaaac ctacaacgga ttcatgcccg caaccgccat cagcgatgcg 300  
gacattgccg ccgtcgccac ttatatcatg aacgcctttg a 341

<210> 40  
<211> 113  
<212> PRT  
<213> Neisseria meningitidis

<220>  
<221> UNSURE  
<222> (84)  
<223> Xaa is any amino acid

<400> 40  
Met Asn Thr Thr Arg Leu Pro Thr Ala Leu Val Leu Gly Cys Phe Cys  
1 5 10 15  
Ala Ala Ala Ser Ala Ala Asp Asn Ser Ile Met Thr Lys Gly Gln Lys  
20 25 30  
Val Tyr Glu Ser Asn Cys Val Ala Cys His Gly Lys Lys Gly Glu Gly  
35 40 45  
Arg Gly Thr Met Phe Pro Pro Leu Tyr Arg Ser Asp Phe Ile Met Lys  
50 55 60  
Lys Pro Gln Val Leu Leu His Ser Met Val Lys Gly Ile Asn Gly Thr  
65 70 75 80  
Ile Lys Val Xaa Arg Gln Asn Leu Gln Arg Ile His Ala Arg Asn Arg  
85 90 95  
His Gln Arg Cys Gly His Cys Arg Arg Arg His Leu Tyr His Glu Arg  
100 105 110  
Leu

<210> 41  
<211> 341  
<212> DNA  
<213> Neisseria meningitidis

<400> 41  
atgaacacaa cccgactgcc gaccgccctc gtcttgggct gcctctgcgc cgccgcttct 60  
gccgccgaca acagcatcat gaçaaaaggg caaaaagtgt acgaatccaa ctgcgtcgcc 120  
tgccacggca aaaagggcga aggccgcgga accatgtttc cgccgctcta ccgctccgac 180  
ttcatcatga aaaaaccgca ggtgctgctg cacagcatgg tcaaaggcat caacggtaca 240  
atcaaagtca acggcaaaac ctacaacgga ttcatgcccg ccaactgccat cagcgatgcg 300  
gacattgccg ccgtcgccac ttatatcatg aacgcctttg a 341

<210> 42  
<211> 341

<212> PRT

<213> *Neisseria meningitidis*

<400> 42

Ala Thr Gly Ala Ala Cys Ala Cys Ala Ala Cys Cys Cys Gly Ala Cys  
1 5 10 15  
Thr Gly Cys Cys Gly Ala Cys Cys Gly Cys Cys Cys Thr Cys Gly Thr  
20 25 30  
Cys Thr Thr Gly Gly Gly Cys Thr Gly Cys Cys Thr Cys Thr Gly Cys  
35 40 45  
Gly Cys Cys Gly Cys Cys Gly Cys Thr Thr Cys Thr Gly Cys Cys Gly  
50 55 60  
Cys Cys Gly Ala Cys Ala Ala Cys Ala Gly Cys Ala Thr Cys Ala Thr  
65 70 75 80  
Gly Ala Cys Ala Ala Ala Ala Gly Gly Gly Cys Ala Ala Ala Ala Ala  
85 90 95  
Gly Thr Gly Thr Ala Cys Gly Ala Ala Thr Cys Cys Ala Ala Cys Thr  
100 105 110  
Gly Cys Gly Thr Cys Gly Cys Cys Thr Gly Cys Cys Ala Cys Gly Gly  
115 120 125  
Cys Ala Ala Ala Ala Ala Gly Gly Gly Cys Gly Ala Ala Gly Gly Cys  
130 135 140  
Cys Gly Cys Gly Gly Ala Ala Cys Cys Ala Thr Gly Thr Thr Thr Cys  
145 150 155 160  
Cys Gly Cys Cys Gly Cys Thr Cys Thr Ala Cys Cys Gly Cys Thr Cys  
165 170 175  
Cys Gly Ala Cys Thr Thr Cys Ala Thr Cys Ala Thr Gly Ala Ala Ala  
180 185 190  
Ala Ala Ala Cys Cys Gly Cys Ala Gly Gly Thr Gly Cys Thr Gly Cys  
195 200 205  
Thr Gly Cys Ala Cys Ala Gly Cys Ala Thr Gly Gly Thr Cys Ala Ala  
210 215 220  
Ala Gly Gly Cys Ala Thr Cys Ala Ala Cys Gly Gly Thr Ala Cys Ala  
225 230 235 240  
Ala Thr Cys Ala Ala Ala Gly Thr Cys Ala Ala Cys Gly Gly Cys Ala  
245 250 255  
Ala Ala Ala Cys Cys Thr Ala Cys Ala Ala Cys Gly Gly Ala Thr Thr  
260 265 270  
Cys Ala Thr Gly Cys Cys Cys Gly Cys Cys Ala Cys Thr Gly Cys Cys  
275 280 285

Ala Thr Cys Ala Gly Cys Gly Ala Thr Gly Cys Gly Gly Ala Cys Ala  
290 295 300

Thr Thr Gly Cys Cys Gly Cys Cys Gly Thr Cys Gly Cys Cys Ala Cys  
305 310 315 320

Thr Thr Ala Thr Ala Thr Cys Ala Thr Gly Ala Ala Cys Gly Cys Cys  
325 330 335

Thr Thr Thr Gly Ala  
340

<210> 43

<211> 399

<212> DNA

<213> Neisseria gonorrhoeae

<400> 43

atgaacacaa cccgactgcc gaccgccttc atcttggtgct gcctctgcgc cgccgcttct 60  
gccgccgaca acagcatcat gacaaaagg caaaaagtgt acgaatccaa ctgcatcgcc 120  
tgccacggca agaaagggga agggcgcggc actgcgtttc ctccgctttt ccggtcggac 180  
tatattatga acaaaccgca cgtcctgctg cacagcatgg tcaaaggcat caacggtaca 240  
atcaaagtca acggcaaaac ctacaacgga ttcatgcccg caaccgccat cagcgatgcg 300  
gacattgccg ccgtcgccac ttatatcatg aacgcctttg acaacggcgg cggaagcggt 360  
accgaaaaag acgtaaaaca ggcaaaaggc aaaaaaac 399

<210> 44

<211> 133

<212> PRT

<213> Neisseria gonorrhoeae

<400> 44

Met Asn Thr Thr Arg Leu Pro Thr Ala Phe Ile Leu Cys Cys Leu Cys  
1 5 10 15

Ala Ala Ala Ser Ala Ala Asp Asn Ser Ile Met Thr Lys Gly Gln Lys  
20 25 30

Val Tyr Glu Ser Asn Cys Ile Ala Cys His Gly Lys Lys Gly Glu Gly  
35 40 45

Arg Gly Thr Ala Phe Pro Pro Leu Phe Arg Ser Asp Tyr Ile Met Asn  
50 55 60

Lys Pro His Val Leu Leu His Ser Met Val Lys Gly Ile Asn Gly Thr  
65 70 75 80

Ile Lys Val Asn Gly Lys Thr Tyr Asn Gly Phe Met Pro Ala Thr Ala  
85 90 95

Ile Ser Asp Ala Asp Ile Ala Ala Val Ala Thr Tyr Ile Met Asn Ala  
100 105 110

Phe Asp Asn Gly Gly Gly Ser Val Thr Glu Lys Asp Val Lys Gln Ala

115

120

125

Lys Gly Lys Lys Asn  
130

&lt;210&gt; 45

&lt;211&gt; 402

&lt;212&gt; DNA

&lt;213&gt; Neisseria meningitidis

&lt;400&gt; 45

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atgaacacaa cccgactgcc gaccgccctc gtcttgggct gcttctgcgc cgccgcttct 60
gccgccgaca acagcatcat gacaaaaggg caaaaagtgt acgaatccaa ctgcgtcgcc 120
tgccacggca aaaaggcgga aggccgcgga accatgtttc cgccgctcta ccgctccgac 180
ttcatcatga aaaaaccgca ggtgctgctg cacagcatgg tcaaaggcat caacggtaca 240
atcaaagtca acggcaaaac ctacaacgga ttcatgcccg caaccgccat cagcgatgcg 300
gacattgccg ccgtcgccac ttatatcatg aacgcctttg acaacggcgg cggaagcggt 360
accgaaaaag acgtaaaaca ggcaaaaagc aaaaaaaact aa 402

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&lt;210&gt; 46

&lt;211&gt; 133

&lt;212&gt; PRT

&lt;213&gt; Neisseria meningitidis

&lt;400&gt; 46

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Met Asn Thr Thr Arg Leu Pro Thr Ala Leu Val Leu Gly Cys Phe Cys
 1             5             10             15

Ala Ala Ala Ser Ala Ala Asp Asn Ser Ile Met Thr Lys Gly Gln Lys
      20             25             30

Val Tyr Glu Ser Asn Cys Val Ala Cys His Gly Lys Lys Gly Glu Gly
      35             40             45

Arg Gly Thr Met Phe Pro Pro Leu Tyr Arg Ser Asp Phe Ile Met Lys
      50             55             60

Lys Pro Gln Val Leu Leu His Ser Met Val Lys Gly Ile Asn Gly Thr
      65             70             75             80

Ile Lys Val Asn Gly Lys Thr Tyr Asn Gly Phe Met Pro Ala Thr Ala
      85             90             95

Ile Ser Asp Ala Asp Ile Ala Ala Val Ala Thr Tyr Ile Met Asn Ala
      100            105            110

Phe Asp Asn Gly Gly Gly Ser Val Thr Glu Lys Asp Val Lys Gln Ala
      115            120            125

Lys Ser Lys Lys Asn
      130

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&lt;210&gt; 47

<211> 396  
 <212> DNA  
 <213> *Neisseria meningitidis*

<400> 47  
 atgaacacaa cccgactgcc gaccgccctc gtcttgggct gcctctgcgc cgccgcttct 60  
 gccgccgaca acagcatcat gacaaaaggg caaaaagtgt acgaatccaa ctgcgtcgcc 120  
 tgccacggca aaaagggcga aggccgcgga accatgtttc cgccgctcta ccgctccgac 180  
 ttcacatcatga aaaaaccgca ggtgctgctg cacagcatgg tcaaaggcat caacggtaca 240  
 atcaaagtca acggcaaaaac ctacaacgga ttcattgccc ccaactgccat cagcgatgcg 300  
 gacattgccg ccgtcgccac ttatatcatg aacgcctttg acaacggcgg cggaagcggt 360  
 accgaaaaag acgtaaaaac ggcaaaaaac aaaaaa 396

<210> 48  
 <211> 132  
 <212> PRT  
 <213> *Neisseria meningitidis*

<400> 48  
 Met Asn Thr Thr Arg Leu Pro Thr Ala Leu Val Leu Gly Cys Leu Cys  
 1 5 10 15  
 Ala Ala Ala Ser Ala Ala Asp Asn Ser Ile Met Thr Lys Gly Gln Lys  
 20 25 30  
 Val Tyr Glu Ser Asn Cys Val Ala Cys His Gly Lys Lys Gly Glu Gly  
 35 40 45  
 Arg Gly Thr Met Phe Pro Pro Leu Tyr Arg Ser Asp Phe Ile Met Lys  
 50 55 60  
 Lys Pro Gln Val Leu Leu His Ser Met Val Lys Gly Ile Asn Gly Thr  
 65 70 75 80  
 Ile Lys Val Asn Gly Lys Thr Tyr Asn Gly Phe Met Pro Ala Thr Ala  
 85 90 95  
 Ile Ser Asp Ala Asp Ile Ala Ala Val Ala Thr Tyr Ile Met Asn Ala  
 100 105 110  
 Phe Asp Asn Gly Gly Gly Ser Val Thr Glu Lys Asp Val Lys Gln Ala  
 115 120 125  
 Lys Asn Lys Lys  
 130

<210> 49  
 <211> 495  
 <212> DNA  
 <213> *Neisseria gonorrhoeae*

<400> 49  
 atgaacaaca gacattttgc cgtcatcgcc ttgggcagca accttgacaa ccccgacaaa 60  
 caaatacgcg gcgcattaga cgcgctctcg tccatcctg acatccggct tgaacagggt 120  
 tcctcactgt atatgaccgc acctgtcggt tacgacaatc agccccgatt catcaatgcc 180

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gtctgcaccg tttccaccac cttggacggc attgccctgc ttgccgaact caaccgtatc 240
gaagccgatt tcggacgcga acgcagtttc cgcaatgcac cgcgcacatt ggatttggac 300
attatcgact ttgacggcat ctccagcgac gacccccgcc ttaccctgcc gcatccgcgc 360
gcgcacgaac gcagtttcgt catacgccct ttggcagaaa tcctccctga ttttattttg 420
ggaaaatacg gaaaggttgt cgaattgtca aaacggctgg gcaatcaagg catccgtctt 480
ttaccggaca ggtaa 495

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<210> 50  
 <211> 164  
 <212> PRT  
 <213> *Neisseria gonorrhoeae*

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<400> 50
Met Asn Asn Arg His Phe Ala Val Ile Ala Leu Gly Ser Asn Leu Asp
  1             5             10             15

Asn Pro Ala Gln Gln Ile Arg Gly Ala Leu Asp Ala Leu Ser Ser His
      20             25             30

Pro Asp Ile Arg Leu Glu Gln Val Ser Ser Leu Tyr Met Thr Ala Pro
      35             40             45

Val Gly Tyr Asp Asn Gln Pro Asp Phe Ile Asn Ala Val Cys Thr Val
      50             55             60

Ser Thr Thr Leu Asp Gly Ile Ala Leu Leu Ala Glu Leu Asn Arg Ile
      65             70             75             80

Glu Ala Asp Phe Gly Arg Glu Arg Ser Phe Arg Asn Ala Pro Arg Thr
      85             90             95

Leu Asp Leu Asp Ile Ile Asp Phe Asp Gly Ile Ser Ser Asp Asp Pro
      100            105            110

Arg Leu Thr Leu Pro His Pro Arg Ala His Glu Arg Ser Phe Val Ile
      115            120            125

Arg Pro Leu Ala Glu Ile Leu Pro Asp Phe Ile Leu Gly Lys Tyr Gly
      130            135            140

Lys Val Val Glu Leu Ser Lys Arg Leu Gly Asn Gln Gly Ile Arg Leu
      145            150            155            160

Leu Pro Asp Arg

```

<210> 51  
 <211> 497  
 <212> DNA  
 <213> *Neisseria meningitidis*

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<400> 51
atgaacaaca gacatthttgc cgtcatcgcc ctgggcagta atcttgaaaa ccctgctcaa 60
cagggtacgcg ccgcattgga cacgctgtcg tcccatcctg acatccgtct taaacaggct 120
tcctcactgt atatgaccgc gcccgctcgt tacgacaatc agccccgatt tgtcaatgcc 180

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gtctgcaccg tttccaccac tctggacggc attgccytgc ttgccgaact caaccgtatc 240
gaggctgatt tcggacgcga acgcagcttc cgcaacgcgc cgcgcacatt gkatttggac 300
attatcgact ttgacggcat ctccagcgac gacacscgac tcaccttgcc gcatccgcgc 360
gcgcacgaac gcagtttcgt catccgcocct ttggcagaaa tcctccctga ttttgtttta 420
ggaaaacacg gaaagggttg cgaattgtca aaacggytgg gcaatcaagg tatccgtctt 480
ttaccggaca ggtaatt 497

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```

<210> 52
<211> 164
<212> PRT
<213> Neisseria meningitidis

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<220>
<221> UNSURE
<222> (98)
<223> Xaa is any amino acid

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<400> 52
Met Asn Asn Arg His Phe Ala Val Ile Ala Leu Gly Ser Asn Leu Glu
  1             5             10             15

Asn Pro Ala Gln Gln Val Arg Ala Ala Leu Asp Thr Leu Ser Ser His
      20             25             30

Pro Asp Ile Arg Leu Lys Gln Ala Ser Ser Leu Tyr Met Thr Ala Pro
      35             40             45

Val Gly Tyr Asp Asn Gln Pro Asp Phe Val Asn Ala Val Cys Thr Val
      50             55             60

Ser Thr Thr Leu Asp Gly Ile Ala Leu Leu Ala Glu Leu Asn Arg Ile
      65             70             75             80

Glu Ala Asp Phe Gly Arg Glu Arg Ser Phe Arg Asn Ala Pro Arg Thr
      85             90             95

Leu Xaa Leu Asp Ile Ile Asp Phe Asp Gly Ile Ser Ser Asp Asp Thr
      100            105            110

Arg Leu Thr Leu Pro His Pro Arg Ala His Glu Arg Ser Phe Val Ile
      115            120            125

Arg Pro Leu Ala Glu Ile Leu Pro Asp Phe Val Leu Gly Lys His Gly
      130            135            140

Lys Val Ala Glu Leu Ser Lys Arg Leu Gly Asn Gln Gly Ile Arg Leu
      145            150            155            160

Leu Pro Asp Arg

```

```

<210> 53
<211> 495
<212> DNA
<213> Neisseria meningitidis

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<400> 53  
atgaacaaca gacattttgc cgtcatcgcc ctggggcagta atcttgaaaa ccctgccc aa 60  
caggtacgcg ccgcattgga cagctgtcg tcccatcctg acatccgtct taaacaggct 120  
tcctcactgt atatgaccgc gcccgtcggt tacgacaatc agcccgattt cgtcaatgcc 180  
gtctgcaccg tttccaccac cttggacggc attgccctgc ttgccgaact caaccgtatc 240  
gaagccgatt tcggacgcga acgcagcttc cgcaacgcgc cgcgcacatt ggatttggac 300  
attatcgact ttgacggcat ctccagcgac gacccccgac tcaccctgcc gcatccgcgc 360  
gcgcacgaac gcagtttctg catacgcctt ttggcagaaa tcctccctga ttttattttg 420  
ggaaaacacg gaaaggttgc cgaattgtca aaacggctgg gcaatcaagg catccgtctt 480  
ttaccggata agtaa 495

<210> 54  
<211> 164  
<212> PRT  
<213> Neisseria meningitidis

<400> 54  
Met Asn Asn Arg His Phe Ala Val Ile Ala Leu Gly Ser Asn Leu Glu  
1 5 10 15  
Asn Pro Ala Gln Gln Val Arg Ala Ala Leu Asp Thr Leu Ser Ser His  
20 25 30  
Pro Asp Ile Arg Leu Lys Gln Ala Ser Ser Leu Tyr Met Thr Ala Pro  
35 40 45  
Val Gly Tyr Asp Asn Gln Pro Asp Phe Val Asn Ala Val Cys Thr Val  
50 55 60  
Ser Thr Thr Leu Asp Gly Ile Ala Leu Leu Ala Glu Leu Asn Arg Ile  
65 70 75 80  
Glu Ala Asp Phe Gly Arg Glu Arg Ser Phe Arg Asn Ala Pro Arg Thr  
85 90 95  
Leu Asp Leu Asp Ile Ile Asp Phe Asp Gly Ile Ser Ser Asp Asp Pro  
100 105 110  
Arg Leu Thr Leu Pro His Pro Arg Ala His Glu Arg Ser Phe Val Ile  
115 120 125  
Arg Pro Leu Ala Glu Ile Leu Pro Asp Phe Ile Leu Gly Lys His Gly  
130 135 140  
Lys Val Ala Glu Leu Ser Lys Arg Leu Gly Asn Gln Gly Ile Arg Leu  
145 150 155 160  
Leu Pro Asp Lys

<210> 55  
<211> 261  
<212> DNA  
<213> Neisseria gonorrhoeae

<400> 55  
atgccccgcg ctgccgtagc ctttgagcgt catcatcaca aaagcaaagc cgaacaaaat 60  
acccatcgcc ggcgcgacgc agagatagcc gaaggcttcg cggttggaaa tcagcacacg 120  
caggcgcgaa accagtccgt aatggcggta cagctgccgc tcgtcgcctt ttcggataaa 180  
gtggttgtcg cgttccaagc tgttgttcag gcggaaatac aggttttcgc tgatggcggc 240  
aaaacgtggc aaaagccata a 261

<210> 56  
<211> 86  
<212> PRT  
<213> Neisseria gonorrhoeae

<400> 56  
Met Pro Arg Ala Ala Val Ala Phe Glu Arg His His His Lys Ser Lys  
1 5 10 15  
Ala Glu Gln Asn Thr His Arg Arg Ala Asp Ala Glu Ile Ala Glu Gly  
20 25 30  
Phe Ala Val Gly Asn Gln His Thr Gln Ala Arg Asn Gln Ser Val Met  
35 40 45  
Ala Val Gln Leu Pro Leu Val Ala Phe Ser Asp Lys Val Val Val Ala  
50 55 60  
Phe Gln Ala Val Val Gln Ala Glu Ile Gln Val Phe Ala Asp Gly Gly  
65 70 75 80  
Lys Thr Trp Gln Lys Pro  
85

<210> 57  
<211> 261  
<212> DNA  
<213> Neisseria meningitidis

<400> 57  
atgccccgcg ctgctgtagc ctttgagcgt catcatcaca aaagcaaagc cgaacaaaat 60  
acccatcgcc gtgccgacgc agagatagcc gaaggcttcg cggttggaaa tcagcacacg 120  
caggcgcgca agcagtccgt aatggcggta cagctgccgc cggtcgcctt ttcggataaa 180  
gtggttgtcg cgttccaagc tgttgttcag gcggaaatac aggttttcgc tgatggcggc 240  
aaaacgtggc aaaagccata a 261

<210> 58  
<211> 86  
<212> PRT  
<213> Neisseria meningitidis

<400> 58  
Met Pro Arg Ala Ala Val Ala Phe Glu Arg His His His Lys Ser Lys  
1 5 10 15  
Ala Glu Gln Asn Thr His Arg Arg Ala Asp Ala Glu Ile Ala Glu Gly

[illegible]

<400> 61

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atgggttttc ctgttcgcaa gtttgatgcc gtgattgtcg gcggtggcgg tgcaggttta 60
cgtgcagccc tccaattatc caaatccggt ttgaattgtg ccgttttgtc taaagtgttc 120
ccgacccgct cgcataccgt agcggcgcag ggcggtatct ccgcctctct gggtaatgtg 180
caggaggacc gttgggactg gcacatgtac gataccgtga aaggttccga ctggctgggc 240
gaccaagatg cgattgagtt tatgtgtcgc gctgcgcctg aagcgggtgat tgagttggaa 300
cacatgggta tgccttttga ccgcgttgaa agcggcaaaa tttatcagcg tcctttcggc 360
ggacatactg ccgaacatgg taaacgtgcg gtagaacgtg catgtgcggt tgccgaccgt 420
accggtcatg cgatgttgca tactttgtac caacaaaacg tccgtgccaa tacacaattc 480
tttgtggaat ggacggcgca agatttgatt cgtgatgaaa acggcgatgt cgtcggcgta 540
accgccatgg aaatggaaac gggcgaagtt tatattttcc acgccaaaggc cgtgatgttt 600
gctaccggtg gcggcggtcg tatttatgct tcttctacca atgcttatat gaataccggt 660
gacggttttg gcatttgcgc ccgtgcgggc attccgttgg aagatatgga attctggcaa 720
ttccacccga ccggcgtggc ggggtgcgggc gtgttgatta ccgaaggcgt acgcggcgag 780
ggcgttattc tgttgaacgc cgacggcgaa cgctttatgg aacgctatgc gccgaccgta 840
aaagacttgg cttctcgcga cgtggtttca cgcgcgatgg cgatggaaat ctatgaagg 900
cgcggctgtg gtaaaaaaaa agaccacgtc ttactgaaaa tgcaccatat cgggtgcagaa 960
aaaattatgg aaaaactgcc gggcatccgc gagatttcca ttcagtttgc cggtatcgat 1020
ccgattaaag acccgattcc ggttgtgccg actaccact atatgatggg cggcattccg 1080
accaattatc acggtgaagt tgttgttccg caaggcgacg agtacgaagt acctgtaaaa 1140
ggcctgtatg ccgcaggtga gtgcgcctgt gcttccgtac acggtgcgaa ccgtttgggt 1200
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<210> 62

<211> 415

<212> PRT

<213> *Neisseria gonorrhoeae*

<400> 62

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Gly Ala Gly Leu Arg Ala Ala Leu Gln Leu Ser Lys Ser Gly Leu Asn
  20             25             30

Cys Ala Val Leu Ser Lys Val Phe Pro Thr Arg Ser His Thr Val Ala
  35             40             45

Ala Gln Gly Gly Ile Ser Ala Ser Leu Gly Asn Val Gln Glu Asp Arg
  50             55             60

Trp Asp Trp His Met Tyr Asp Thr Val Lys Gly Ser Asp Trp Leu Gly
  65             70             75             80

Asp Gln Asp Ala Ile Glu Phe Met Cys Arg Ala Ala Pro Glu Ala Val
  85             90             95

Ile Glu Leu Glu His Met Gly Met Pro Phe Asp Arg Val Glu Ser Gly
 100            105            110

Lys Ile Tyr Gln Arg Pro Phe Gly Gly His Thr Ala Glu His Gly Lys
 115            120            125

Arg Ala Val Glu Arg Ala Cys Ala Val Ala Asp Arg Thr Gly His Ala
 130            135            140
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Met Leu His Thr Leu Tyr Gln Gln Asn Val Arg Ala Asn Thr Gln Phe  
 145 150 155 160  
 Phe Val Glu Trp Thr Ala Gln Asp Leu Ile Arg Asp Glu Asn Gly Asp  
 165 170 175  
 Val Val Gly Val Thr Ala Met Glu Met Glu Thr Gly Glu Val Tyr Ile  
 180 185 190  
 Phe His Ala Lys Ala Val Met Phe Ala Thr Gly Gly Gly Gly Arg Ile  
 195 200 205  
 Tyr Ala Ser Ser Thr Asn Ala Tyr Met Asn Thr Gly Asp Gly Leu Gly  
 210 215 220  
 Ile Cys Ala Arg Ala Gly Ile Pro Leu Glu Asp Met Glu Phe Trp Gln  
 225 230 235 240  
 Phe His Pro Thr Gly Val Ala Gly Ala Gly Val Leu Ile Thr Glu Gly  
 245 250 255  
 Val Arg Gly Glu Gly Gly Ile Leu Leu Asn Ala Asp Gly Glu Arg Phe  
 260 265 270  
 Met Glu Arg Tyr Ala Pro Thr Val Lys Asp Leu Ala Ser Arg Asp Val  
 275 280 285  
 Val Ser Arg Ala Met Ala Met Glu Ile Tyr Glu Gly Arg Gly Cys Gly  
 290 295 300  
 Lys Asn Lys Asp His Val Leu Leu Lys Ile Asp His Ile Gly Ala Glu  
 305 310 315 320  
 Lys Ile Met Glu Lys Leu Pro Gly Ile Arg Glu Ile Ser Ile Gln Phe  
 325 330 335  
 Ala Gly Ile Asp Pro Ile Lys Asp Pro Ile Pro Val Val Pro Thr Thr  
 340 345 350  
 His Tyr Met Met Gly Gly Ile Pro Thr Asn Tyr His Gly Glu Val Val  
 355 360 365  
 Val Pro Gln Gly Asp Glu Tyr Glu Val Pro Val Lys Gly Leu Tyr Ala  
 370 375 380  
 Ala Gly Glu Cys Ala Cys Ala Ser Val His Gly Ala Asn Arg Leu Gly  
 385 390 395 400  
 Thr Asn Ser Leu Leu Asp Leu Val Val Phe Arg Pro Thr Pro Arg  
 405 410 415

<210> 63  
 <211> 696  
 <212> DNA  
 <213> Neisseria meningitidis

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<222> (1)  
<223> N is any nucleotide

<220>  
<221> misc\_feature  
<222> (100)  
<223> N is any nucleotide

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cgttgggact ggcacatgta cgataccgtg aaaggttccg actggttggg cgaccaagat 180  
gcgattgagt ttatgtgccg cgccgcgcct gaagccgtaa ttgagttgga acacatgggt 240  
atgccttttg accgtgtgga aagcggtaaa atttatcagc gtcctttcgg cggccatact 300  
gccgaacacg gtaaacgcgc ggtagaacgc gyctgtgcgg ttgccgaccg tacaggcat 360  
gcgatgctgc atactttgta ccaacaaaac gtccgtgcc aacgcaatt ctttgtggaa 420  
tggaaggcac aagatttgat tcgtgatgaa aacggcgatg tcgtcggcgt aaccgccatg 480  
gaaatggaaa ccggcggaagt ttatatattc cacgctaaag ctgtgatgtt tgctaccggc 540  
ggcggcggtc gtatttatgc gtcttctacc aatgcctata tgaataccgg cgatgggttg 600  
ggatattgtg cgcggtgcagg tatcccgttg gaagacatgg aattctggca attccagccg 660  
accggcgtgg cgggtgcggg cgtgttgatt accgaa 696

<210> 64  
<211> 234  
<212> PRT  
<213> Neisseria meningitidis

<220>  
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<222> (1)  
<223> Xaa is any amino acid

<220>  
<221> UNSURE  
<222> (34)  
<223> Xaa is any amino acid

<220>  
<221> UNSURE  
<222> (112)  
<223> Xaa is any amino acid

<400> 64  
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Phe Pro Thr Arg Ser His Thr Val Ala Ala Gln Gly Gly Ile Ser Ala  
20 25 30  
Ser Xaa Gly Asn Val Gln Glu Asp Arg Trp Asp Trp His Met Tyr Asp  
35 40 45  
Thr Val Lys Gly Ser Asp Trp Leu Gly Asp Gln Asp Ala Ile Glu Phe

50                      55                      60  
 Met Cys Arg Ala Ala Pro Glu Ala Val Ile Glu Leu Glu His Met Gly  
   65                      70                      75                      80  
 Met Pro Phe Asp Arg Val Glu Ser Gly Lys Ile Tyr Gln Arg Pro Phe  
                     85                      90                      95  
 Cys Ala Val Ala Asp Arg Thr Gly His Ala Met Leu His Thr Leu Tyr  
                     100                      105                      110  
 Gln Gln Asn Val Arg Ala Asn Thr Gln Phe Phe Val Glu Trp Thr Ala  
                     115                      120                      125  
 Gln Asp Leu Ile Arg Asp Glu Asn Gly Asp Val Val Gly Val Thr Ala  
                     130                      135                      140  
 Met Glu Met Glu Thr Gly Glu Val Tyr Ile Phe His Ala Lys Ala Val  
   145                      150                      155                      160  
 Met Phe Ala Thr Gly Gly Gly Gly Arg Ile Tyr Ala Ser Ser Thr Asn  
                     165                      170                      175  
  
 Gly Ile Pro Leu Glu Asp Met Glu Phe Trp Gln Phe Gln Pro Thr Gly  
                     180                      185                      190  
 Val Ala Gly Ala Gly Val Leu Ile Thr Glu  
                     195                      200

<210> 65  
 <211> 1764  
 <212> DNA  
 <213> Neisseria meningitidis

<220>  
 <221> misc\_feature  
 <222> (67)  
 <223> N is any nucleotide

<220>  
 <221> misc\_feature  
 <222> (408)  
 <223> N is any nucleotide

<400> 65  
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 ccgaccggtt cgcataccgt agcggcgag ggcggtattt ccgcctctct gggtaatgtg 180  
 caggaagacc gttgggactg gcacatgtac gataccgtga aaggttccga ctggttgggc 240  
 gaccaagatg cgattgagtt tatgtgccgc gccgcgcctg aagccgtaat tgagttggaa 300  
 cacatgggta tgccttttga ccgtgtggaa agcggtaaaa tttatcagcg tcctttcggc 360  
 ggccatactg ccgaacacgg taaacgcgcg gtagaacgcg cctgtgcngt tgccgaccgt 420  
 acaggtcatg cgatgctgca tactttgtac caacaaaatg tccgtgccaa tacgcaattc 480  
 tttgtggaat ggacggcaca agatttgatt cgtgatgaaa acggcgatgt cgtcggcgta 540  
 accgccatgg aaatggaaac cggcgaagtt tatattttcc acgctaaagc tgtgatgttt 600



gctaccggcg gcggcgggcg tatttatgcg tcttctacca atgcctatat gaataccggc 660  
gatggtttgg gtatttgtgc gcgtgcaggt atcccgttgg aagacatgga attctggcaa 720  
ttccaccgca ccggcggtggc aggtgcgggc gtgttgatta ccgaaggcgt acgcggcgag 780  
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cgcggtctgcg gtaaaaacaa agaccatgtc ttactgaaaa tcgaccatat cggcgcgagaa 960  
aaaattatgg aaaaactgcc gggcatccgc gagatttcca ttcagttcgc cggtatcgat 1020  
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accaactacc atggcgaggt tgtcgttcct caaggcgacg aatacgaagt gcctgtaaaa 1140  
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acgaactccc tgctggactt agtggatttc ggtaaagctg ccggcgacag catgattaaa 1260  
ttcatcaaag agcaaagcga ctggaaacct ttgcctgcta atgcggcgca actgaccgcg 1320  
caacgtatcg agcgtttgga caatcaaact gatggtgaaa acgttgatgc attgcgcgcg 1380  
gaactgcaac gctccgtaca attgcacgcc ggcggtgtcc gtactgatga gattctgagc 1440  
aaaggcgttc gagaagtcac ggcgattgcc gagcgtgtga aacgtaccga aatcaaagac 1500  
aagagcaaaag tgtggaatac cgcgcgatc gaggctttgg aattggataa cctaattgaa 1560  
gtggcgaaaag cgactttggt gtctgccgaa gcacgtaaaag aatcacgcgg tgcgcacgct 1620  
tcagacgacc atcctgagcg cgatgatgaa aactggatga aacatacgct gtaccattca 1680  
  
gatgccaaata ccttgtccta caaacgggtg cacaccaagc ctttgagcgt ggaatacatc 1740  
aaaccggcca agcgcgttta ttga 1764

<210> 66  
<211> 587  
<212> PRT  
<213> *Neisseria meningitidis*

<220>  
<221> UNSURE  
<222> (23)  
<223> Xaa is any amino acid

<400> 66  
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Gly Ala Gly Leu Arg Ala Xaa Leu Gln Leu Ser Lys Ser Gly Leu Asn  
20 25 30  
Cys Ala Val Leu Ser Lys Val Phe Pro Thr Arg Ser His Thr Val Ala  
35 40 45  
Ala Gln Gly Gly Ile Ser Ala Ser Leu Gly Asn Val Gln Glu Asp Arg  
50 55 60  
Trp Asp Trp His Met Tyr Asp Thr Val Lys Gly Ser Asp Trp Leu Gly  
65 70 75 80  
Asp Gln Asp Ala Ile Glu Phe Met Cys Arg Ala Ala Pro Glu Ala Val  
85 90 95  
Ile Glu Leu Glu His Met Gly Met Pro Phe Asp Arg Val Glu Ser Gly  
100 105 110  
Lys Ile Tyr Gln Arg Pro Phe Gly Gly His Thr Ala Glu His Gly Lys  
115 120 125

Arg Ala Val Glu Arg Ala Cys Ala Val Ala Asp Arg Thr Gly His Ala  
 130 135 140  
 Met Leu His Thr Leu Tyr Gln Gln Asn Val Arg Ala Asn Thr Gln Phe  
 145 150 155 160  
 Phe Val Glu Trp Thr Ala Gln Asp Leu Ile Arg Asp Glu Asn Gly Asp  
 165 170 175  
 Val Val Gly Val Thr Ala Met Glu Met Glu Thr Gly Glu Val Tyr Ile  
 180 185 190  
 Phe His Ala Lys Ala Val Met Phe Ala Thr Gly Gly Gly Gly Arg Ile  
 195 200 205  
 Tyr Ala Ser Ser Thr Asn Ala Tyr Met Asn Thr Gly Asp Gly Leu Gly  
 210 215 220  
 Ile Cys Ala Arg Ala Gly Ile Pro Leu Glu Asp Met Glu Phe Trp Gln  
 225 230 235 240  
 Phe His Pro Thr Gly Val Ala Gly Ala Gly Val Leu Ile Thr Glu Gly  
 245 250 255  
 Val Arg Gly Glu Gly Gly Ile Leu Leu Asn Ala Asp Gly Glu Arg Phe  
 260 265 270  
 Met Glu Arg Tyr Ala Pro Thr Val Lys Asp Leu Ala Ser Arg Asp Val  
 275 280 285  
 Val Ser Arg Ala Met Ala Met Glu Ile Tyr Glu Gly Arg Gly Cys Gly  
 290 295 300  
 Lys Asn Lys Asp His Val Leu Leu Lys Ile Asp His Ile Gly Ala Glu  
 305 310 315 320  
 Lys Ile Met Glu Lys Leu Pro Gly Ile Arg Glu Ile Ser Ile Gln Phe  
 325 330 335  
 Ala Gly Ile Asp Pro Ile Lys Asp Pro Ile Pro Val Val Pro Thr Thr  
 340 345 350  
 His Tyr Met Met Gly Gly Ile Pro Thr Asn Tyr His Gly Glu Val Val  
 355 360 365  
 Val Pro Gln Gly Asp Glu Tyr Glu Val Pro Val Lys Gly Leu Tyr Ala  
 370 375 380  
 Ala Gly Glu Cys Ala Cys Ala Ser Val His Gly Ala Asn Arg Leu Gly  
 385 390 395 400  
 Thr Asn Ser Leu Leu Asp Leu Val Val Phe Gly Lys Ala Ala Gly Asp  
 405 410 415  
 Ser Met Ile Lys Phe Ile Lys Glu Gln Ser Asp Trp Lys Pro Leu Pro  
 420 425 430

Ala Asn Ala Gly Glu Leu Thr Arg Gln Arg Ile Glu Arg Leu Asp Asn  
435 440 445

Gln Thr Asp Gly Glu Asn Val Asp Ala Leu Arg Arg Glu Leu Gln Arg  
450 455 460

Ser Val Gln Leu His Ala Gly Val Phe Arg Thr Asp Glu Ile Leu Ser  
465 470 475 480

Lys Gly Val Arg Glu Val Met Ala Ile Ala Glu Arg Val Lys Arg Thr  
485 490 495

Glu Ile Lys Asp Lys Ser Lys Val Trp Asn Thr Ala Arg Ile Glu Ala  
500 505 510

Leu Glu Leu Asp Asn Leu Ile Glu Val Ala Lys Ala Thr Leu Val Ser  
515 520 525

Ala Glu Ala Arg Lys Glu Ser Arg Gly Ala His Ala Ser Asp Asp His  
530 535 540

Pro Glu Arg Asp Asp Glu Asn Trp Met Lys His Thr Leu Tyr His Ser  
545 550 555 560

Asp Ala Asn Thr Leu Ser Tyr Lys Pro Val His Thr Lys Pro Leu Ser  
565 570 575

Val Glu Tyr Ile Lys Pro Ala Lys Arg Val Tyr  
580 585

<210> 67  
<211> 1248  
<212> DNA  
<213> Neisseria gonorrhoeae

<400> 67  
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cgtgcagccc tccaattatc caaatccggt ttgaattgtg ccgttttgtc taaagtgttc 120  
ccgacccgct cgcataccgt agcggcgcag ggcggtatct ccgcctctct gggtaatgtg 180  
caggaggacc gttgggactg gcacatgtac gataccgtga aaggttccga ctggctgggc 240  
gaccaagatg cgattgagtt tatgtgtcgc gctgcgcctg aagcggatgat tgagttggaa 300  
cacatgggta tgccttttga ccgcgttgaa agcggcaaaa tttatcagcg tcctttcggc 360  
ggacatactg ccgaacatgg taaacgtgcg gtagaacgtg catgtgcggt tgccgaccgt 420  
accggtcatg cgatgttgca tactttgtac caacaaaacg tccgtgccaa tacacaattc 480  
tttgtggaat ggacggcgca agatttgatt cgtgatgaaa acggcgatgt cgtcggcgta 540  
accgccatgg aaatggaaac gggcgaagtt tatattttcc acgccaaggc cgtgatgttt 600  
gctaccgggtg gcggcggtcg tatttatgct tcttctacca atgcttatat gaataccggt 660  
gacggtttgg gcatctgcgc ccgtgcgggc attccgttgg aagatatgga attctggcaa 720  
ttccacccga ccggcgtggc ggggtgcggc gtgttgatta ccgaaggcgt acgcggcgag 780  
ggcgggtatc tgttgaacgc cgacggcgaa cgctttatgg aacgctatgc gccgaccgta 840  
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cgcggctgtg gtaaaaaaa agaccacgtc ttactgaaaa tcgaccatat cgggtgcagaa 960  
aaaattatgg aaaaactgcc gggcatccgc gagatttcca ttcagtttgc cggtatcgat 1020  
ccgattaaag acccgattcc ggttgtgcgc actaccact atatgatggg cggcattccg 1080  
accaattatc acggtgaagt tgttgttccg caaggcgacg agtacgaagt acctgtaaaa 1140

ggcctgtatg ccgcaggtga gtgcgcctgt gcttccgtac acggtgcgaa ccgtttgggt 1200  
 acgaactccc tgctggactt ggtggtgttc cgcccaaccc cccggtga 1248

<210> 68  
 <211> 415  
 <212> PRT  
 <213> Neisseria gonorrhoeae

<400> 68  
 Met Gly Phe Pro Val Arg Lys Phe Asp Ala Val Ile Val Gly Gly Gly  
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 Gly Ala Gly Leu Arg Ala Ala Leu Gln Leu Ser Lys Ser Gly Leu Asn  
 20 25 30  
 Cys Ala Val Leu Ser Lys Val Phe Pro Thr Arg Ser His Thr Val Ala  
 35 40 45  
 Ala Gln Gly Gly Ile Ser Ala Ser Leu Gly Asn Val Gln Glu Asp Arg  
 50 55 60  
 Trp Asp Trp His Met Tyr Asp Thr Val Lys Gly Ser Asp Trp Leu Gly  
 65 70 75 80  
 Asp Gln Asp Ala Ile Glu Phe Met Cys Arg Ala Ala Pro Glu Ala Val  
 85 90 95  
 Ile Glu Leu Glu His Met Gly Met Pro Phe Asp Arg Val Glu Ser Gly  
 100 105 110  
 Lys Ile Tyr Gln Arg Pro Phe Gly Gly His Thr Ala Glu His Gly Lys  
 115 120 125  
 Arg Ala Val Glu Arg Ala Cys Ala Val Ala Asp Arg Thr Gly His Ala  
 130 135 140  
 Met Leu His Thr Leu Tyr Gln Gln Asn Val Arg Ala Asn Thr Gln Phe  
 145 150 155 160  
 Phe Val Glu Trp Thr Ala Gln Asp Leu Ile Arg Asp Glu Asn Gly Asp  
 165 170 175  
 Val Val Gly Val Thr Ala Met Glu Met Glu Thr Gly Glu Val Tyr Ile  
 180 185 190  
 Phe His Ala Lys Ala Val Met Phe Ala Thr Gly Gly Gly Gly Arg Ile  
 195 200 205  
 Tyr Ala Ser Ser Thr Asn Ala Tyr Met Asn Thr Gly Asp Gly Leu Gly  
 210 215 220  
 Ile Cys Ala Arg Ala Gly Ile Pro Leu Glu Asp Met Glu Phe Trp Gln  
 225 230 235 240  
 Phe His Pro Thr Gly Val Ala Gly Ala Gly Val Leu Ile Thr Glu Gly  
 245 250 255

Val Arg Gly Glu Gly Gly Ile Leu Leu Asn Ala Asp Gly Glu Arg Phe  
 260 265 270  
 Met Glu Arg Tyr Ala Pro Thr Val Lys Asp Leu Ala Ser Arg Asp Val  
 275 280 285  
 Val Ser Arg Ala Met Ala Met Glu Ile Tyr Glu Gly Arg Gly Cys Gly  
 290 295 300  
 Lys Asn Lys Asp His Val Leu Leu Lys Ile Asp His Ile Gly Ala Glu  
 305 310 315 320  
 Lys Ile Met Glu Lys Leu Pro Gly Ile Arg Glu Ile Ser Ile Gln Phe  
 325 330 335  
 Ala Gly Ile Asp Pro Ile Lys Asp Pro Ile Pro Val Val Pro Thr Thr  
 340 345 350  
 His Tyr Met Met Gly Gly Ile Pro Thr Asn Tyr His Gly Glu Val Val  
 355 360 365  
 Val Pro Gln Gly Asp Glu Tyr Glu Val Pro Val Lys Gly Leu Tyr Ala  
 370 375 380  
 Ala Gly Glu Cys Ala Cys Ala Ser Val His Gly Ala Asn Arg Leu Gly  
 385 390 395 400  
 Thr Asn Ser Leu Leu Asp Leu Val Val Phe Arg Pro Thr Pro Arg  
 405 410 415

<210> 69  
 <211> 1767  
 <212> DNA  
 <213> Neisseria meningitidis

<400> 69  
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 ccgaccggtt cgcataccgt agcggcgag ggcggtattt ccgcctctct gggtaatgtg 180  
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 ggccatactg ccgaacacgg taaacgcgcg gtagaacgcg cctgtgcggt tgccgaccgt 420  
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 gatggttttg gtatttgtgc gcgtgcaggt atcccggttg aagacatgga attctggcaa 720  
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 cgcggtgcg gtaaaaaaaa agaccatgtc ttactgaaaa tcgaccatat cggcgagaa 960  
 aaaattatgg aaaaactgcc gggcatccgc gagatttcca ttcagttcgc cggatcgcg 1020  
 ccgattaaag acccgattcc cgttgtgccg actaccact atatgatggg cggcattccg 1080  
 accaattacc acggcgaagt tgtcgttccg caaggtgaag attacgaagt gcctgtaaaa 1140

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ggctctgtatg cggcaggtga gtgcgcttgt gcttccgtac acggtgcgaa ccgcttgggt 1200
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tcagacgacc atcctgagcg cgatgatgaa aactggatga aacatacgct gtaccattca 1680
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aaaccggcca agcgcggttta ttgatga 1767

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<210> 70  
 <211> 587  
 <212> PRT  
 <213> *Neisseria meningitidis*

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<400> 70
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Gly Ala Gly Leu Arg Ala Ala Leu Gln Leu Ser Lys Ser Gly Leu Asn
 20             25             30

Cys Ala Val Leu Ser Lys Val Phe Pro Thr Arg Ser His Thr Val Ala
 35             40             45

Ala Gln Gly Gly Ile Ser Ala Ser Leu Gly Asn Val Gln Glu Asp Arg
 50             55             60

Trp Asp Trp His Met Tyr Asp Thr Val Lys Gly Ser Asp Trp Leu Gly
 65             70             75             80

Asp Gln Asp Ala Ile Glu Phe Met Cys Arg Ala Ala Pro Glu Ala Val
 85             90             95

Ile Glu Leu Glu His Met Gly Met Pro Phe Asp Arg Val Glu Ser Gly
 100            105            110

Lys Ile Tyr Gln Arg Pro Phe Gly Gly His Thr Ala Glu His Gly Lys
 115            120            125

Arg Ala Val Glu Arg Ala Cys Ala Val Ala Asp Arg Thr Gly His Ala
 130            135            140

Met Leu His Thr Leu Tyr Gln Gln Asn Val Arg Ala Asn Thr Gln Phe
 145            150            155            160

Phe Val Glu Trp Thr Ala Gln Asp Leu Ile Arg Asp Glu Asn Gly Asp
 165            170            175

Val Val Gly Val Thr Ala Met Glu Met Glu Thr Gly Glu Val Tyr Ile
 180            185            190

Phe His Ala Lys Ala Val Met Phe Ala Thr Gly Gly Gly Arg Ile

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195					200					205					
Tyr	Ala	Ser	Ser	Thr	Asn	Ala	Tyr	Met	Asn	Thr	Gly	Asp	Gly	Leu	Gly
210					215					220					
Ile	Cys	Ala	Arg	Ala	Gly	Ile	Pro	Leu	Glu	Asp	Met	Glu	Phe	Trp	Gln
225					230					235					240
Phe	His	Pro	Thr	Gly	Val	Ala	Gly	Ala	Gly	Val	Leu	Ile	Thr	Glu	Gly
				245					250					255	
Val	Arg	Gly	Glu	Gly	Gly	Ile	Leu	Leu	Asn	Ala	Asp	Gly	Glu	Arg	Phe
			260					265					270		
Met	Glu	Arg	Tyr	Ala	Pro	Thr	Val	Lys	Asp	Leu	Ala	Ser	Arg	Asp	Val
			275				280					285			
Val	Ser	Arg	Ala	Met	Ala	Met	Glu	Ile	Tyr	Glu	Gly	Arg	Gly	Cys	Gly
290					295					300					
Lys	Asn	Lys	Asp	His	Val	Leu	Leu	Lys	Ile	Asp	His	Ile	Gly	Ala	Glu
305					310					315					320
Lys	Ile	Met	Glu	Lys	Leu	Pro	Gly	Ile	Arg	Glu	Ile	Ser	Ile	Gln	Phe
				325					330					335	
Ala	Gly	Ile	Asp	Pro	Ile	Lys	Asp	Pro	Ile	Pro	Val	Val	Pro	Thr	Thr
			340					345					350		
His	Tyr	Met	Met	Gly	Gly	Ile	Pro	Thr	Asn	Tyr	His	Gly	Glu	Val	Val
			355				360					365			
Val	Pro	Gln	Gly	Glu	Asp	Tyr	Glu	Val	Pro	Val	Lys	Gly	Leu	Tyr	Ala
370					375					380					
Ala	Gly	Glu	Cys	Ala	Cys	Ala	Ser	Val	His	Gly	Ala	Asn	Arg	Leu	Gly
385					390					395					400
Thr	Asn	Ser	Leu	Leu	Asp	Leu	Val	Val	Phe	Gly	Lys	Ala	Ala	Gly	Asp
			405						410					415	
Ser	Met	Ile	Lys	Phe	Ile	Lys	Glu	Gln	Ser	Asp	Trp	Lys	Pro	Leu	Pro
			420					425					430		
Ala	Asn	Ala	Gly	Glu	Leu	Thr	Arg	Gln	Arg	Ile	Glu	Arg	Leu	Asp	Asn
			435				440					445			
Gln	Thr	Asp	Gly	Glu	Asn	Val	Asp	Ala	Leu	Arg	Arg	Glu	Leu	Gln	Arg
450					455					460					
Ser	Val	Gln	Leu	His	Ala	Gly	Val	Phe	Arg	Thr	Asp	Glu	Ile	Leu	Ser
465					470					475					480
Lys	Gly	Val	Arg	Glu	Val	Met	Ala	Ile	Ala	Glu	Arg	Val	Lys	Arg	Thr
			485						490					495	
Glu	Ile	Lys	Asp	Lys	Ser	Lys	Val	Trp	Asn	Thr	Ala	Arg	Ile	Glu	Ala